# 10.—BRACHYURA OF THE HAMBURG MUSEUM EXPEDITION TO SOUTH-WESTERN AUSTRALIA, 1905,

by

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The following paper gives an account of the collections of Brachyura secured by the Hamburg Museum Expedition to the southern part of Western Australia in 1905, under the charge of Drs. W. Michaelsen and R. Hartmeyer.

The fauna of the west coast of Australia is still comparatively poorly known. We have data from Cape Jaubert (Mjoberg Collection, Stockholm), from the Monte Bello Islands (Rathbun, 1914), from Shark Bay (Miers, 1884), and from the Abrolhos Islands (Montgomery, 1931), but every further contribution to the knowledge of this territory will be welcome. I therefore give a complete list of the Hamburg Collection, which was obtained exclusively from the upper littoral ; a few infrequent forms from other Pacific localities have been added, from material belonging to the Berlin Museum (Berl. M.), Hamburg Museum (H.M.), British Museum (B.M.), and the Munich Museum (M. M.). The Hymenosomidae will be otherwise dealt with, and the representatives of *Pilumnus* and *Actumnus* are reserved for fuller treatment of these genera in the *Capita Zoologica*.

Abbreviations additional to the above include Cl (length of carapace) and Cb (breadth of carapace).

As economic conditions preclude the possibility of publication in the same series as previous reports on the collections of the same expedition (*Fauna Südwest-Australiens*), I am much indebted to the Royal Society of Western Australia for having undertaken the publication of this report ; also to Mr. E. W. Bennett for the translation into English.

## TRIBE I.—DROMIACEA.

### FAM. DROMIIDAE.

### Genus DROMIDIOPSIS Borradaile.

Ihle 1913, p. 25.

This genus, distinguished from the closely related *Dromidia* by having epipods on the chelipeds, has hitherto included seven Indo-Pacific species, most of which are tropical. The following species is now to be added.

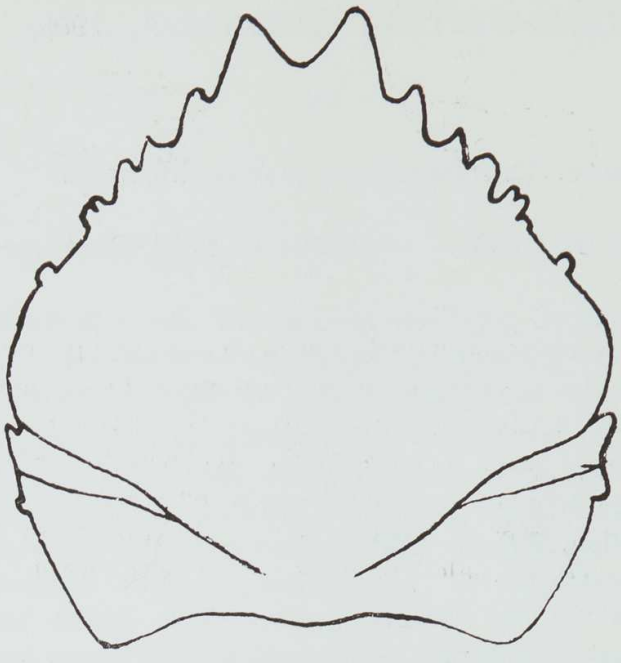
#### **Dromidiopsis michaelseni** *sp. nov.

*Localities.*—Fremantle District : Port Royal, Cockburn Sound, 14·5—18 m., 30/9/05 ; 2 females (type). Warnbro Sound, 12·5—14·5 m., 1 female. Shark Bay · Freycinet Estuary, 7—11 m., 1 male.

*Description.*—Carapace as broad as long, moderately inflated, covered with fine tomentum. Of the regional markings, only the cervical groove

* Named in honour of the collector, Dr. W. Michaelsen of Hamburg.

is distinct. The upper surface is smooth beneath the tomentum except for some tuberculations above the hepatic region.

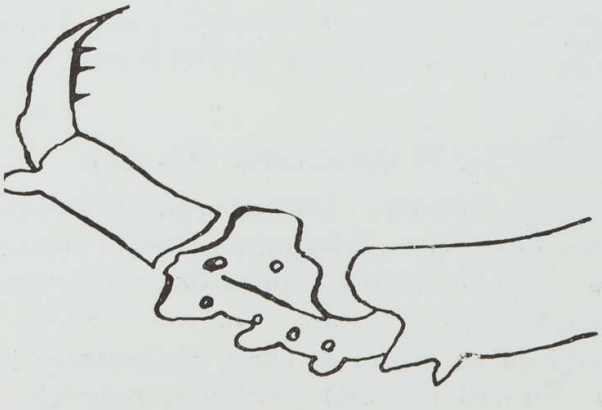


Text-fig. 1.—**Dromidiopsis michaelseni** nov. sp., outline of carapace.

The middle tooth of the front is strongly deflexed and not visible from above ; the two laterals are well developed triangular lobes, fused with the supra-ocular spine. The extra- and infra-orbital spines are distinct (Text-fig. 1).

The antero-lateral margin bears five tubercles, of which the first is the largest, while the others decrease in size from before backwards ; the fourth is behind the cervical groove, the fifth approximately above the insertion of the second pereiopod. The distance between the 3rd and 4th is the greatest and equals that between the 1st and 3rd.

On the under-surface there are a subhepatic tubercle, a pleural tubercle, and another at the angle of the buccal cavern. The pereiopods are tomentose. The cheliped is a little longer than the first walking leg, the carpus with about 9 tubercles on the outer side, palm with about 8. On the fingers there is a whitish strip above and below, free from hairs ; the fingers are toothed and close accurately. The epipod characteristic of the genus is present. The 1st and 2nd walking legs are very characteristic ; the meri end distally in a tubercle on the upper margin, the carpi have 3 tubercles on the upper edge and a carina on the outer surface, which terminates distally in a tubercle (Text-fig. 2). Between the carina and the upper edge are



Text-fig. 2.—Outline of the second walking leg (Pereiopod 3).

several other small tubercles. The propods likewise end distally in an upper tubercle, and the dactyli, in addition to the horny terminal claw, bear several small spinules on the lower margin. The 3rd walking leg (Text-fig. 3, P 4,)

Text-fig. 3.—Terminal joints of the fourth (P5) and third (P4) walking legs.

which as usual is shorter than the 4th, is armed on the propod with 5 spinules ; two are placed below, so that the more elongated dactylus can move between them, and the other three are dorsal, above the articulation of the dactylus. Equally distinctive is the armature of the 4th walking leg (Text-fig. 3, P 5) ; here also the propod bears two smaller spinules between which the dactylus can be flexed, and 3 or even 4 more terminally placed on the propod. The sternal grooves of the female end in front in a moderate tubercle between the 2nd pereiopods.

Median Cl. 22 mm.
Cb. 23 mm.

*Affinities.*—The sculpture of the pereiopods is especially characteristic of the species ; the form is superficially similar to that of *Cryptodromia tuberculata*, but separated by the epipods on the chelipeds.

*Cryptodromia tuberculata* Stimpson.

Ihle 1913, p. 35.

*Locality.*—Cossack ; coll. Gale (M.H.).

*Distribution.*—The species occurs from India to Japan and in the Malay Archipelago.

FAMILY DYNOMENIDAE.

Genus DYNOMENE Latreille.

Ihle's list of species (Ihle 1913, p. 92) should be supplemented by *D.* (*Maxillothrix*) *actaeiformis* Stebbing 1921 (cf. Odhner 1925, p. 85).

*Dynomene spinosa* Rathbun.

Rathbun 1911, p. 196 ; pl. 17, fig. 1.

*Localities.*—1 female non-ovig. (Cl. 17mm., Cb. 20 mm.) ; Marquesas Islands (M.H.).
1 juv. (Cl. 12 mm., Cb. 13 mm.) ; Palau (M.H.).

The following may be added to Miss Rathbun's description :—

Although the margin of the front is unarmed, the upper and lower margins of the orbit each bear three small spinules. On the upper surface of the carapace there are four larger spines on each side, near and dorsal to the lateral teeth, save that there is none opposite the last lateral tooth, but instead a number of sharp granules. The post-frontal lobes (2F), the hepatic region (2L), and the branchial region (5L) are also provided with a number of these large granules. On the chelipeds, the upper margin of the merus

and the outer surface of the carpus, are armed with a number of sharp spines ; the inner tooth of the carpus is also a long sharp spine. On the outer surface of the palm, there are four rows of small blunt granules, hidden beneath the tomentum, and the upper surface bears two rows of three sharp spines each. The walking legs are beset with a number of large acute spines ; on the last of the larger walking legs (P4) there are four such spines on the upper margin on both merus and carpus, in addition to similar spines at the distal margin of the joint and on the under margin. The propod and dactylus on the other hand are provided with large granules only.

*Distribution.*—The species has been known hitherto only from Coetivy (Western India).

## TRIBE II.—OXYSTOMATA.

### FAM. CALAPPIDAE.

#### *Calappa lophos* (Herbst).

Alcock 1896, p. 144.

Miers 1886, p. 286.

Rathbun 1923, p. 137.

*Locality.*—1 male, between Geraldton and Fremantle (M.H.).

*Distribution.*—Tropical Indo-Pacific, from the east coast of Africa to Japan and Australia, but not further east. In Australia it has hitherto been known only fron the east coast—Port Jackson (Miers) ; Bowen, Queensland ; Sandon Bluff, N.S.W. (Rathbun)

#### *Matuta banksii* Leach.

*Matuta banksii* Alcock 1896, p. 158.

*Matuta picta* Hesse 1865, p. 158, pl. 6, fig. 13.

Haswell 1882, p. 135.

*Locality.*—1 male, Cossack, coll. Gale (M.H.).

*Distribution.*—Throughout the whole of the warmer Indo-Pacific, from the Red Sea to the Marquesas Islands. In Australia it is known from Moreton Bay, Port Jackson, Sydney. etc., but not from the south coast and, hitherto, not from the west.

#### *Matuta planipes* Fabricius.

*Matuta lunaris* Alcock 1896, p. 161.

*planipes* Rathbun 1922, p. 138.

*laevidactyla* Miers 1886, p. 296.

*lineifera* Miers 1876, p. 245, pl. 39, fig. 7.

Haswell 1882, p. 134.

*Locality.*—1 male, Cossack, coll. Gale (M.H.).

*Distribution.*—Throughout the warmer Indo-Pacific. In Australia it is known from Nicol Bay, Chowder Bay, Port Jackson, Port Inskip (Rathbun).

## FAM. LEUCOSIIDAE.

### Genus ACTAEOMORPHA Miers.

Miers 1876, p. 183.
Alcock 1896, p. 172.
Ihle 1918, p. 208.

An Indo-Pacific genus ; the only species hitherto known fron Australia is *A. sculpta* Haswell, originally described from Fitzroy Islands, Queensland, and recorded also by Miss Rathbun (1924, p. 25) from Cape Jaubert on the west coast.

#### *Actaeomorpha erosa* Miers.

Miers 1878, p. 184, pl. 14, figs. 1–6.
Chilton 1911, p. 555.
Bouvier 1915, p. 47, pl. 6, figs. 2, 3.
Edmondson 1925, p. 30.

*Locality.*—1 male juv., Shark Bay, Surf Point, $\frac{1}{2}$–$3\frac{1}{2}$ m. (M.H.).

*Distribution.*—Port Curtis, Queensland (Haswell), Kermadec Islands (Chilton), Ocean Island, Molokai (Hawaii) (Edmondson), Mauritius (Bouvier). Hitherto not known from the west coast of Australia.

### Genus EBALIA Leach.

Alcock 1896, p. 185.
Ihle 1918, pp. 225, 310.

Of the Australian species, of which unfortunately only a little material is at my disposal, the species described by Miers (1886, p 309. pl. 25, fig. 4) from Port Jackson is undoubtedly identical with the original *E. quadridentata*, described from the same locality by Stimpson (1907, p. 155, pl. 18, fig. 6). *E. crassipes* Bell, also from Port Jackson, appears to differ only in the somewhat different chela.

#### *Ebalia* (*Phlyxia*) *intermedia* Miers.

*Ebalia intermedia* Miers 1886, p. 308, pl. 25, fig. 2.
*Phlyxia intermedia* Rathbun 1923, p. 135.
Hale 1927 (a), p. 313 ; 1927 (b), p. 198 , fig. 199.

*Locality.*—3 males, 2 females, Oyster Harbour (Albany district), $\frac{3}{4}$–$5\frac{1}{2}$ m. (M.H.).

*Distribution.*—Southern Australia, Port Phillip (Miers), Kangaroo Island (Rathbun, Hale), Oyster Bay, Tasmania (Rathbun).

#### *Ebalia* (*Phlyxia*) *quadrata* A. Milne Edwards.

(Pl. XIII., fig. 1.)

*Phlyxia quadrata* A. Milne Edwards 1873 (a), p. 86.
Haswell 1882, p. 125.

*Locality.*—1 male, Bass Strait (type ; M.H.).

As this species has not hitherto been rediscovered and as Milne Edwards has not figured it, an illustration is here provided. Milne Edwards' descrip-

tion is as follows (translation from German rendering) :—" The species exhibits most of the characters of *Nursia* Leach ; the outer margins of the third maxillipeds are nevertheless but slightly arched. The carapace is rhomboidal ; it is strongly elevated along the median line, and the hepatic regions are much lower than the gastric. The mesobranchial lobes are much more elevated than the epibranchial. The front extends forwards well beyond the eyes, and in the median line is curved inwards. The posterior margin bears two projections. The body and legs are covered with very fine granules, which are close together and become stronger towards the lateral margins. The male chelipeds are moderately long, fingers rather large. The 7th joint of the male abdomen bears at its base a median tooth-like projection, which fits into a notch on the 6th. Breadth of carapace 1 cm., length 1·1 cm."

*Relationships.*—The species is a true *Ebalia.* and has no relationships with *Nursia.*

## TRIBE III.—BRACHYGNATHA.

### SUPERFAMILY OXYRHYNCHA.

### FAM. I. HYMENOSOMIDAE.

The representatives of this family, collected by the expedition, will be otherwise dealt with.

### FAM. II.—MAJIDAE.

### SUBFAM. INACHINAE Alcock.

*Camposcia retusa* Latr.

Alcock 1895, p. 184.

Miers 1884, p. 189.

*Localities.*—1 male, Useless Inlet, Shark Bay, coll. King (M.H.).
1 female, Freycinet Reach, Shark Bay.

*Distribution.*—A common species in the Indo-Pacific tropical littoral. It has already been recorded from Shark Bay (Miers), and is also known from the east coast (Cape Grenville and Port Denison). Not known from the south or from New Zealand.

### ANACINETOPS Miers.

*Anacinetops* Miers 1879, p. 3.
Ortmann 1894, p. 38.

*Eruma* McCulloch 1913, p. 336.

The following is the only species :—

*Anacinetops stimpsoni* (Miers).

*Eucinetops stimpsoni* Miers 1879, p. 3.

*Anacinetops stimpsoni* Ortmann 1894, p. 38, pl. 3, fig. 2.

*Paramicippa hispida* Baker 1905, p. 126, pl. 24, fig. 6 (fig. poor).

*Eruma hispida* McCulloch 1913, p. 336, fig. 48.
Hale 1927 (b), p. 131, fig. 130.

*Locality.*—1 male, N.W. Australia (M.H.) ; Cl. 23 m.

An examination of the literature has brought the above synonymy to light.

*Distribution.*—Thursday Island (Ortmann), N. coast of Australia (Miers) Port Willunga, Port Lincoln (Baker).

### EPHIPPIAS Rathbun.

Rathbun 1918 (b), p. 9.

The genus is closely related to *Naxia* Latreille, and is more primitive in that the joints of the male abdomen are free, whereas in *Naxia* joints 4–6 are fused. The following is the only species :—

### *Ephippias endeavouri* Rathbun.

Rathbun 1918 (b), p. 9, pl. 15.

McNeill 1920, p. 109.

Hale 1927 (b), p. 131, fig. 131.

Montgomery 1931, p. 416.

*Locality.*—1 female non-ovig., N.W. Australia (M.H.), strongly overgrown with algae.

*Distribution.*—Kangaroo Island, S. Australia (Rathbun), Botany Bay, N.S.W. (McNeill), Abrolhos Islands (Montgonery).

### NAXIA Leach.

*Naxia* Leach in Latr., Encycl. Meth. Entom., X., p. 140.

Rathbun 1897, p. 157.

Hale 1927 (b), p. 127.

(*nec Naxia* H. Milne Edwards 1834, p. 313 ; see under *Paranaxia.*)

*Halimus* Latr., l.c., 1825, p. 700.

H. Milne Edwards 1834, p. 340.

Haswell 1882, p. 5.

Miers 1879, p. 646.

Baker 1905, p. 119.

(*nec Halimus* Rathbun 1879, p. 158 ; see under *Hyastenus.*)

The type species is *Pisa aurita* Latreille.

Not only the synonymy of the genus—for which see Calman 1913, p. 312—but also that of the various species is very involved, and I therefore quote it here, following McCulloch (1908 and 1913).

The species appear to prefer colder waters, most of them being confined to the south coast of Australia.

There is a subgenus *Microhalimus* Haswell, with a single species, *M. eflexus* Haswell.

*Naxia aries* (Guérin.)

*Halimus aries* Latreille in Guérin, Iconographie Règne animal, vol. 3, pl. 9, figs. 2, 2a–c (*sine descriptione*).
H. Milne Edwards 1834, p. 341 ; Atlas, Cuvier's Règne animal, pl. 28, fig. 2, 2a–c. Crustacées.

*Halimus gracilis* Baker 1905, p. 124, pl. 23, figs. 4, 4a.

*Naxia aries* McCulloch 1913, p. 337.
Rathbun 1918 (b), p. 11.
Hale 1927 (b), p. 129, fig. 128.

*Distribution.*—A fairly common species on the south coast of Australia, Investigator Straits, Flinders Island, Bass Strait.

*Naxia aurita* (Latr.).

*Pisa aurita* Latr., Encycl. Mèth. Entom., vol. 10, 1825, p. 140.

*Halimus auritus* H. Milne Edwards 1834, p. 41 ; Atlas, Cuvier's Règne animal, pl. 28, figs. 3, 3a–b.
Kinahan 1856, p. 117.
Ortmann 1893, p. 39.

*Halimus laevis* Haswell 1880, p. 435 ; 1882, p. 6.
Baker 1905, p. 119, pl. 21, figs. 1, 1a–c.
McCulloch 1908, p. 54.

*Naxia aurita* McCulloch 1913, p. 327.
Hale 1927 (b), p. 129, fig. 127.
Montgomery 1931, p. 423.

*Localities.*—1 male Cockburn Sound, Fremantle District, 3–4 m. (M.H.).
3 females (1 ovig.), Princess Royal Harbour, Albany District, 5½–9 m. (M.H.).
1 male, Middleton Beach, Albany District, 5½–8 m. (M.H.).

*Distribution.*—Commonest of the littoral Oxyrhynchs of the south coast of Australia Victoria, Port Phillip, Tasmania, D'Entrecasteaux Channel; Western Australia, King George Sound, Abrolhos Islands.

*Naxia spinosa* (Hess).

*Halimus spinosus* Hess 1865, p. 129, pl. 6, fig. 1.
Haswell 1882, p. 6.
de Man 1887, p. 691 (Haswell's specimen).
McCulloch 1908, p. 53.
Chilton 1911, p. 562.

*Halimus truncatipes* Miers, 1879, p. 3.
Baker 1905, p. 120, pl. 22, figs. 2, 2a.
Fulton and Grant, 1906, p. 16.

*Naxia spinosa* Hale 1927 (b), p. 127, fig. 125.

*Localities.*—1 female without eggs, Koombana Bay, Bunbury District, 14·5–18 m. (M.H.).
1 male, St. Vincent's Gulf, Zeitz coll. (M.M.).

*Geographical Distribution.*—Sydney, Victoria, Port Willunga, Kermadec Islands.

? *Naxia* (*Halimus*) *rubiginosus* Kirk.

Recorded from New Zealand by Filhol (1885, p. 352.)

*Naxia tumida* (Dana).

*Halimus tumidus* Dana 1852, p. 115, pl. 4, figs. 2, a–g.
Haswell 1882, p. 6.
Baker 1905, p. 121, pl. 22, fig. 3.
McCulloch 1908, p. 53.
Aurivillius 1889, pl. 2, fig. 6.

*Naxia tumida* Hale 1927 (b), p. 128, fig. 126.

*Distribution.*—Moreton Bay, Port Jackson, Port Phillip, St. Vincent Gulf ; common at Kangaroo Island.

Genus ZEWA McCulloch.

McCulloch 1913, p. 332.

The genus consists of two Australian species.

*Zewa varians* (Miers).

*Pseudomicippe* (?) *varians* Miers 1879, p. 12, pl. 4, fig. 8a.
1884, p. 97.
1886, p. 68.
Ortmann 1895, p. 40.
Calman 1900, p. 39, pl. 2, figs. 25, 26

(*nec P. varians* Rathbun 1893, p. 92 = *Micippoides longimanus*, *fide* McCulloch 1913, p. 334).

*Zewa varians* McCulloch 1913, p. 334.

*Localities.*—2 males, 2 females, Shark Bay—S.W. of Denham, Useless Inlet, Freycinet Estuary, 3–11 m. (M.H.).

*Distribution.*—Thursday Island, Torres Straits, Port Denison, Queensland ; not known from the south of Australia.

Genus PARATYMOLUS Miers.

Balss 1924, p. 24.

I have already (*l.c.*) given a list of the species and literary references. The genus is purely Indo-Pacific and occurs especially on Australian coasts, but does not occur in New Zealand.

*Paratymolus latipes quadridentatus* Baker.

Baker, 1906, p. 107, pl. 1, fig. 2.

Rathbun 1923, p. 95.

Hale 1927 (b), p. 123, fig. 119.

*Localities.*—1 female, Cockburn Sound, Fremantle district, 6·5–8 m. (M.H.).
1 female, Ponape (M.H.).

*Distribution.*—The forma typica—Port Denison, Port Jackson (Haswell), Newcastle Bight, Manning River (Whitelegge) ; subsp. quadridentata—south coast of Australia (Baker), Spencer Gulf (Rathbun).

### SUBFAMILY ACANTHONYCHINAE.

*Menaethius monoceros* Latreille.

Alcock 1895, p. 197.

Hale 1929, p. 68.

Montgomery 1931, p. 417.

*Localities.*—Numerous specimens from Cossack, coll. Gale (M.H.).
Shark Bay—Denham, Freycinet Reach, Useless Inlet, Inner Bar, South Passage, Surf Point, Sunday Island, Browne Station (M.H.).

*Distribution.*—Common in the tropical Indo-Pacific, from the east coast of Africa to Paumotus. Occurring among seaweed. Australian records: Queensland, Port Denison, Prince of Wales Channel, Port Curtis, Mast Head Island, Cape York, Torres Strait; apparently absent from the south coast.

### SUBFAMILY HYASTENIINAE.

#### Genus MICIPPOIDES A. Milne Edwards.

A. Milne Edwards 1873 (a), p. 78.

The only species is the one below; the second form, *M. longimanus* Haswell (1882, p. 19), has been removed by McCulloch (1913, p. 335) to his new genus *Tumulusternum*.

*Micippoides angustifrons* A. Milne Edwards.

*Micippoides angustifrons* A. Milne Edwards 1873 (a), p. 78, pl. 1, fig. 2.
Ortmann 1893, p. 57.
Rathbun 1911, p. 256, pl. 18, fig. 14.

*Hyastenus andrewsi* Calman, 1909, p. 711, pl. 72, figs. 6, 7.

*Localities.*—1 male, 1 female, N.E. coast of New Guinea (M.H.).

This form, as Calman remarks, effects a transition from *Hyastenus* to *Naxia*.

*Distribution.*—Samoa, Upolu (A. Milne Edwards), Christmas Island (Calman), Coetivy (Rathbun).

#### Genus HYASTENUS White.

*Hyastenus* White 1847, p. 56.
Miers 1879, p. 658; 1886, p. 55.
Alcock 1895, p. 206.
Calman 1913, p. 313.

*Lahaina* Dana 1852, p. 92.

*Halimus* Rathbun 1897, p. 158.
Borradaile 1903, p. 687.
Laurie 1906, p. 376.
Parisi 1915, p. 290.
Balss 1924, p. 32.
Stebbing 1908, p. 5.

*Chorinus* H. Milne Edwards 1834, p. 316 (*partim*).
Adams and White 1848, p. 11 (*partim*).
(nec *Halimus* Latreille, see p. 119).

(*Chorilia* Dana 1852, p. 11, is usually regarded as a synonym, but has been treated as valid by Rathbun 1925, p. 202).

As the synonymy of the genus is complicated it will be helpful to provide the following list of species :—

*Hyastenus agassizii* (Rathbun 1922), Maldives, Ceylon.
*aries* (Latr.), Singapore.
*auctus* Rathbun 1916, Sulu Archipelago, N.W. Austr.
*biformis* Rathbun 1916, Sulu Archipelago.
*borradailei* (Rathbun 1907), Amirante, Cape Jaubert, Funafuti.
*brachichirus* Nobili 1900, Beagle Bay.
*brevicornis* Ortmann 1894, Kilwa.
*brockii* de Man 1871 India, Amboina, Ternate.
*calvarius* Alcock 1895, India.
*consobrinus* A. Milne Edwards 1895 (said to be from Straits of Magellan ; according to Laurie 1906 the same as *H. spinosus* A.M.E.).
*convexus* Miers 1884 (= *subinermis* Zehnter 1894 = *tuberculosus* Rathbun 1916), India, N.W. Australia.
*cristimanus* (A. Milne Edwards 1865 ; cf. Bouvier 1906, p. 490).
? *dumerilii* (H. Milne Edwards), Polynesia.
*elegans* Miers 1886, Kei Islands.
*elongatus* Ortmann 1893, Japan, Amirante.
*espinosus* (Borradaile 1903), Laccadives, N.W. Australia.
*fraterculus* Rathbun 1916, Sulu Archipelago.
*gracilirostris* Miers 1879, Zanzibar, Fiji.
*hilgendorfi* de Man 1887, Madagascar to Hawaii.
*inermis* (Rathbun 1911), Seychelles, etc.
*irami* (Laurie 1906), Ceylon, N.W. Australia.
*longipes* Dana 1852, Japan, Alaska, California.
*minimus* Rathbun 1924, N.W. Australia.
*orbis* Rathbun 1916, Sulu Archipelago.
*oryx* A. Milne Edwards 1872, Ceylon–Australia.
*ovatus* Dana 1852, Amirante, Hawaii.
*pehlevi* (Laurie 1906), Ceylon.
*planasius* (Adams and White 1847), India to China, Eastern Australia.
*pleione* (Herbst 1803), India, etc.
*scrobiculatus* Rathbun 1916, Sulu Archipelago.
*sebae* (White 1847), Mauritius, Western Australia, Philippines.
*sphenocarcinoides* (Rathbun 1916), Philippines.
*spinosus* A. Milne Edwards 1872, Mozambique, Fiji.
*tenuicornis* Pocock 1890, Red Sea–Hawaii.
*tinaktensis* Rathbun 1916, Sulu Archipelago.
*trispinosus* Rathbun 1916, Sulu Archipelago.
*uncifer* Calman 1909, Cape of Good Hope to Christmas Island.
*verrucosipes* (Adams and White), Torres Strait.

*Hyastenus oryx* A. Milne Edwards.

Alcock 1895, p. 214.

Calman 1900, p. 35.

Rathbun 1914, p. 661.

*Localities.*—Shark Bay–Freycinet Reach, Browne Station, South Passage, 3·5–9 m. (M.H.).
Mactan Islands (M.H.).
Cockburn Sound, Fremantle district, 14·5–18 m. (M.H.).

*Distribution.*—Common in the tropical Indo-Pacific ; Ceylon to the Philippines and China. Torres Strait (Calman), Thursday Island (Miers), Port Molle, Port Denison (Miers), Darnley Island (Haswell), Prince of Wales Channel (Miers), Monte Bello Islands (Rathbun), Shark Bay (Miers). Not known from the south coast.

*Hyastenus convexus* Miers.

Miers 1884, p. 196, pl. 18, fig. B.
Henderson 1893, p. 344.
Calman 1900, p. 35.
de Man 1902, p. 664, pl. 22, fig. 32.
Borradaile 1903, p. 687.
Grant and McCulloch 1906, p. 32.
Rathbun 1918, p. 15 ; 1924, p. 3.
(Laurie 1906, p. 377, var. *hendersoni*).

*Locality.*—1 female, Onslow, Gale coll. (M.H.).

*Distribution.*—India, Suadive Atol, Ternate, Torres Strait, Queensland, Port Curtis, Masthead Island, Port Molle, Western Australia, Cape Jaubert. Not on the southern Australian coast.

## SUBFAMILY MAJINAE.

### Genus SCHIZOPHRYS H. Milne Edwards.

*Schizophrys aspera* H. Milne Edwards.

Alcock 1895, p. 243 ; Illustrations *Investigator*, pl. 35, fig. 1.
Calman 1900, p. 39.
Rathbun 1918, p. 25 ; 1924, p. 6.
Hale 1927 (b), p. 134, fig. 139.

*Locality.*—1 female ovig., Western Australia (no further data), (M.H.).

*Distribution.*—Common from the Red Sea to Japan and Funafuti. In Australia it is known from Torres Strait (Calman), Cape Jaubert (Rathbun), South Australia (Hale), Spencer Gulf (Rathbun).

*Schizophrys dama* (Herbst).

Miers 1884, p. 197 ; 1886, p. 67.
Alcock 1895, p. 245 ; Illustrations *Investigator*, pl. 35, fig. 2.
Rathbun 1914, p. 662 ; 1924, p. 6.

*Localities.*—Onslow, Gale coll. (M.H.).
Heirisson Prong, Useless Inlet, Shark Bay (M.H.).
Between Geraldton and Fremantle.

Many of the specimens are covered with the Hydroid *Corymorpha* (*Euphysa*) *balssi* Stechow.

*Distribution.*—Straits of Malacca (Alcock) ; Western Australia—Shark Bay (Miers), King George Sound, Monte Bello Islands (Rathbun), Cape Jaubert (Rathbun).

It is therefore distinctively a western species in Australia, and in contrast to Montgomery (1913, p. 420) I consider the above two species as distinct, on the grounds that their distribution is different.

*Cyclax suborbicularis* (Stimpson).

Alcock 1895, p. 245.

Calman 1900, p. 39.

Stimpson 1907, p. 18, pl. 4, fig. 1.

Hale 1929, p. 68.

Montgomery 1931, p. 419.

*Locality.*—1 female with eggs, Surf Point, Shark Bay, 0·5–3·5 m.

*Distribution.*—From the Red Sea and Zanzibar to Rotuma. In Australia it has hitherto been known only from Dirk Hartog Island, W.A., (Hale), and from the Abrolhos Islands (Montgomery).

Genus LEPTOMITHRAX Miers.

Balss 1929, p. 19 (list of species).

*Leptomithrax Sternocostulatus* (H. Milne Edwards).

*Paramithrax sternocostulatus* H. Milne Edwards 1851, p. 291 (name only) ; pl. X, figs. 3, 4.

Miers 1879, p. 9.

Grant and McCulloch 1906, p. 28, pl. 3, figs. 2, 2a.

*gaimardii* Miers 1876 (b), p. 6.

*Leptomithrax sternocostulatus* Rathbun 1918, p. 22.

Hale 1927 (b), p. 137, fig. 137.

*Locality.*—1 female, Sunday Island, Shark Bay, 5·5 m. (M.H.).

Of the sternal excavations, which are so characteristic of the male, the female possesses only four small ones on the anterior segment ; two are larger and transversely oval, and the other two in front, smaller, and triangular.

*Distribution.*—New Zealand, Masthead Island, Queensland, Port Jackson, Port Phillip, Kingston (S.A.), Kangaroo Island.

*Leptomithrax cf. spinulosus* Haswell.

Rathbun 1918, p. 20, pl. 9 (refs.).

*Locality.*—1 male, Cl. 14 mm., Oyster Harbour (Albany district), 5·5 m. (M.H.).

I have unfortunately not seen Haswell's original description of 1880, but Miss Rathbun's key leads to this species. In the specimen examined, however, there are only three instead of four spines on the branchial region, and the last of these is inserted well up on the carapace. The under surface is not hairy ; the swellings at the junction on the merus and ischium of the third maxillipeds are distinctly developed on both sides, and the distal spine on the outer edge of the ischium. The palm of the chela is longer than the carpus.

Perhaps this species belongs to *L. australiensis* Miers (Tasmania), of which an adequate description is still required.

*Distribution.*—*L. spinulosus* is known from New South Wales to Tasmania ; Kingston, Kangaroo Island, Eucla, King George Sound.

Genus ACANTHOPHRYS (H. Milne Edwards).

Balss 1929, p. 19 (synonymy).

*Acanthophrys aculeatus* (H. Milne Edwards).

*Chorinus aculeatus* H. Milne Edwards 1834, p. 316.
Lanchester 1900, p. 724.

*Paramithrax aculeatus* var. *armatus* Miers 1884, p. 193, pl. 18, fig. A.
Alcock 1895, p. 241.
Calman 1900, p. 38.

*Chlorinoides aculeatus* Henderson 1893, p. 345.
Rathbun 1910, p. 318 ; 1924, p. 5.
(*nec Acanthophrys aculeatus* A. Milne Edwards 1865, pl. 4, fig. 4 ; = *A. spatulifer* Haswell, *fide* Bouvier 1906, p. 488).

*Localities.*—(a) 1 female, non-ovig., Cl. 25 mm. (Rostrum and spine of posterior margin missing) ; Lacepede Islands, N.W. Australia. With the Ascidian *Botrylloides niger* Herdman on the back (M.H.).

(b) 1 female juv., Cl. 15·5 mm. ; Dzushi, Sagami Bay, Japan, 110 m. ; Doflein collection (M.M.).

(c) 1 female ovig., Cl. 38 mm., Gulf of Siam, near mouth of the Menam ; coll. Spraeter (M.M.).

*Remarks.*—Specimens *a* and *c* agree in that there are only two spines on the orbital edge, and the meri of the walking legs are armed with two spines ; specimen *b* from Japan, however, has three orbital spines, and the walking legs have only one spine on the merus. The latter characteristic is typical of the species, while two spines on the merus are described for the variety *armatus* Miers. I am unable to say, however, what the number of spines may be on the orbit of the typical form.

Specimen *b* agrees in the condition of the orbit with *A. longispina* de Haan, so that it may be the young stage of this species ; but in that case the young stage has only one cardiac spine, in contrast to the two of the adult.

*Distribution.*—Gulf of Martaban (Henderson), Ceylon (Alcock), Singapore, Malacca (Lanchester), Mergui Archipelago (Alcock), Gulf of Siam (Rathbun), Torres Strait (Calman), Thursday Island (Miers), Port Curtis, Queensland (Miers), Cape Jaubert (Rathbun). Not previously recorded from Japan.

SUBFAMILY MITHRACINAE.

*Micippa philyra* Leach.

Miers 1884, p. 198.
Alcock 1895, p. 249.
Montgomery 1931, p. 423.

*Locality.*—1 female, Useless Inlet, Shark Bay, coll. King (M.H.).

*Distribution.*—From the Red Sea to Australia ; on the west coast it is known from Broome, Abrolhos (Montgomery), and Shark Bay (Miers) ; the var. *nodulifera* Baker occurs on the south coast, but is rare.

*Micippa thalia* Herbst.

Miers 1884, p. 251.
Alcock 1895, p. 198.

*Locality.*—1 female, Moreton Bay, Queensland.

*Distribution.*—From the Red Sea to New Caledonia ; in Australia it is known from the Swan River (Miers) and Queensland (Miers).

SUBFAMILY MACROCOELOMINAE.

Genus PARANAXIA Rathbun.

*Naxia* H. Milne Edwards 1834, p. 313 (*nec Naxia* Leach).
Haswell 1882, p. 20.
Ortmann 1894, p. 42 (*partim*).
*Paranaxia* Rathbun 1924, p. 6.
Balss 1929, p. 22.

The following is the only species :—

*Paranaxia serpulifera* (Guérin).

*Pisa serpulifera* Guérin, Iconographie, Crustacées, pl. 8, fig. 2.
*Naxia serpulifera* H. Milne Edwards 1834, p. 313.
Haswell 1882, p. 21.
Miers 1884, p. 196.
Ortmann 1894, p. 43.
Calman 1900, p. 37.
*Naxioides serpulifera* Rathbun 1914, p. 661, pl. 2, figs. 9, 10.
*Paranaxia serpulifera* Rathbun 1924, p. 7.

*Localities.*—1 female, Barrow Islands (Cl. 103 mm. exclusive of rostrum). 1 male (Cl. 82 mm.), 1 male (Cl. 47 mm.), 2 small males ; Useless Inlet, Shark Bay, coll. King (M.H.).

*Distribution.*—Torres Strait, Thursday Island, Port Essington, Raffles Bay, Cape Jaubert, Monte Bello Islands, Shark Bay. Nor known from southern Australia.*

III.—FAMILY PARTHENOPIDAE.

Genus LAMBRUS. Leach.

*Lambrus* Alcock 1895, p. 259.
*Parthenope* Weber ; Rathbun 1925, p. 511.

Subgenus PLATYLAMBRUS Stimspon.

*Lambrus* (*Platylambrus*) *validus* (de Haan).

*Lambrus validus* Bleeker 1856, p. 17.
Gersteacker 1856, p. 117.
Balss 1922, p. 134 (refs.).
Flipse 1930, p. 92.

*This fine crab is not rare in South-Western Australia.—Ed.

*Locality.*—1 male (Cl. 37 mm.), Bowen, Queensland, on corals (M.H.).

Contrary to the rule among the Parthenopidae, this specimen has not a naked carapace, but is covered by three large Lamellibranch shells.

*Distribution.*—Japan, Korea, China, Singapore, Sumatra (Padang), Torres Strait, Samoa. New for Australia.

Subgenus RHINOLAMBRUS A. Milne Edwards.

*Rhinolambrus pelagicus* (Ruppell).

Alcock 1895, p. 267.
Rathbun 1914, p. 663.

*Locality.*—1 female, juv., Shark Bay, near Browne Station, 2·5 mm. (M.H.).

*Distribution.*—Tropical Indo-Pacific, from the east coast of Africa to Samoa. Not known from the south coast of Australia.

Genus THYROLAMBRUS Rathbun.

*Thyrolambrus* Rathbun (1894) 1925, p. 531.
*Parthenomerus* Alcock 1895, p. 280.
*Parthenopoides* Miers 1879 (*partim*) in Bouvier 1915, p. 52.
Flipse 1930, p. 93.

The type of the subgenus *Parthenopoides* Miers (1879, p. 762) is *Lambrus massena* Roux, which, however, belongs to the subgenus *Pseudolambrus* Paulson 1875, which was founded four years previously. *Parthenopoides* accordingly becomes a synonym of *Pseudolambrus*, and can not, as Bouvier would have it, be used, according to the international rules of nomenclature, for other species. Bouvier's two species *Parthenopoides erosus* Miers and *P. cariei* Bouvier therefore belong to the genus *Thyrolambrus* Rathbun. But since the name *Thyrolambrus erosus* Miers 1879 has priority over *Thyrolambrus erosus* Rathbun, I propose the following new name :—

**Thyrolambrus rathbunae** nom. nov.

New name for *T. erosus* Rathbun, not of Miers.

*Thyrolambrus careie* (Bouvier), new combination.

*Parthenopoides careie* Bouvier, 1915, p. 55, text-fig. 20, pl. 7, fig. 6.

*Locality.*—1 male, Cl. 15·5 mm., Cb. 21 mm. ; Palau (M.H.).

*Distribution.*—Hitherto known only from Mauritius.

Genus ZALASIUS Rathbun.

*Trichia* de Haan ; Balss 1922, p. 100.
*Zalasius* McNeill and Ward 1930, p. 374 (refs.).

I agree with Hale and with McNeill and Ward as to the location of this rare genus in the Lambridae. Among the four specimens belonging to the genus available to me, at least two forms are separable, of which that from Nagasaki, Japan, belongs to *Z. dromiaeformis*, the type species of the genus ; the other I refer to Baker's species, and therefore recall my opinion as previously published that *P. australis* is the juvenile form of *P. dromiaeformis*.

*Zalasius australis* (Baker).

*Trichia australis* Baker 1906, p. 115, pl. 3, figs. 1, a–b.

*Trichia dromiaeformis australis* Hale 1927, p. 142, fig. 145.

*Localities.*—1 male, Western Australia (no further data) (M.H.).

1 female, Timor (Dresden Museum, the specimen referred to by Thallwitz 1892, p. 54 ; Cl. 30 mm., Cb. 40 mm.).

1 female, Nossy Bé, Madagascar ; Cl. 30 mm., Cb. 41 mm. (M.H.).

These specimens agree with the Japanese specimen in the strong covering of hairs on the carapace and legs, but differ from it in the following characters :—

(1) The two strong tubercles on the first abdominal segment, which are distinctive of *Z. dromiaeformis* (cf. McNeill and Ward 1930, pl. 59, fig. 7) are quite lacking ; yet the specimens agree approximately in size with the Japanese specimen.

(2) The granulation of the carapace and especially of the abdomen is uniform in size, whereas in *Z. dromiaeformis* there are larger tubercles covered with granules.

(3) The conical projections of the palm and carpus of the cheliped are only weakly developed, whereas in *Z. dromiaeformis* they are pronounced.

I consider therefore that Baker's form is a good species and is not merely a subspecies of *Z. dromiaeformis*, as Hale and McNeill and Ward treat it.

The specimen from Madagascar is somewhat different again. The hair on the carapace is not evenly developed, but rather tends to be grouped into tufts. The margin of the carapace moreover is divided by three notches into four lobes, which project below as strongly granulated lobules. Perhaps this represents yet another species.

*Distribution.*—*Z. dromiaeformis* has hitherto been known from Japan and from Port Denison, Queensland (McNeill and Ward) ; *Z. australis* is known from Port Willunga (South Australia), and now from the above-mentioned localities—Timor, Western Australia, and Madagascar, and therefore cannot be regarded, as Hale has regarded it, as a southern equivalent of *Z. dromiaeformis*.

## SUBTRIBE BRACHYRHYNCHA.

### Family PORTUNIDAE.

### Genus NECTOCARCINUS A. Milne Edwards.

The genus is limited to Australia, New Zealand, and South America. Of the four species, *N. bullatus* (Balss 1923) occurs at Juan Fernandez, *N. antarcticus* (Jacq. and Lucas) in New Zealand, Auckland and Chatham Islands, *N. tuberculosus* A.M.E. in Tasmania and South Australia, and *N. integrifrons* Latr. in the east, south, and west of Australia. The species are therefore fairly distinct in their distribution. Whether this is due to ecological factors, or whether they have but limited powers of swimming as compared with the other members of the family, is a point yet to be determined.

*Nectocarcinus integrifrons* (Latr.).

Haswell 1882, p. 81 (refs.).
Miers 1884, p. 234.
Filhol 1885, p. 383.
Rathbun 1923, p. 130.
Hale 1927 (a), p. 311 ; 1927 (b), p. 152, fig. 153.
Chilton and Bennett 1929, p. 753.

*Localities.*—1 female ovig. (Cl. 42 mm., Cb. 53 mm.), Port Royal, Cockburn Sound (Fremantle District) ; pelagic ; with thick tomentum over the carapace.
3 males, 1 female, Warnbro' Sound, Fremantle District ; 12·5–14·5 m. (M.H.).

*Distribution.*—South Australia (common in St. Vincent's Gulf—Hale), Kangaroo Island ; East Australia—Port Curtis, Port Jackson, Port Phillip (Miers) ; doubtful in New Zealand (Chilton and Bennett) ; new for Western Australia.

Genus NEPTUNUS De Haan.

Alcock 1899, p. 28.

The edible Blue Crab, *N. pelagicus* (L.), is known to be one of the commonest forms of the Indo-Pacific. The closely related *N. sanguinolentus* (Herbst) has an equally wide distribution, but is not so abundant. In Australia the latter species is known from the south coast (Hale 1927 *b*, p. 150) and from the east coast (Port Jackson, Moreton Bay), but not from the west ; nor is it represented in the present collection.

*Neptunus pelagicus* (L.).

Alcock 1899, p. 34.
Whitelegge 1900, p. 154.
Rathbun 1923, p. 130 ; 1924, p. 22.
Hale 1927 (b), p. 149, fig. 150.
Chilton and Bennett 1929, p. 752.
Montgomery 1931, p. 427.

*Localities.*—Barrow Island (M.H.).
Freycinet Reach, Denham (Shark Bay) (M.H.).
Warnbro' Sound, Swan River (Fremantle District) (M.H.).

*Distribution.*—Throughout the Indo-Pacific, but not on the west coast of America ; known already from Western Australia—Swan River, Shark Bay (Miers 1884), Broome (Rathbun 1924), Abrolhos (Montgomery 1931) ; also in South Australia (common in the Adelaide markets—Hale 1927 *b*), and eastern Australia. Not known from Tasmania, and doubtful in New Zealand (Chilton and Bennett).

Genus THALAMITA Latr.

A genus rich in species, and Indo-Pacific in distribution (one species on the west coast of Africa) ; not occurring on the west coast of America. In addition to those recorded below, the following are known from the Western Australian coast :—

*T. crenata* Ruppell ; Broome (Rathbun 1924).
*T. dispar* Rathbun ; Monte Bello Islands.
*T. admete savignyi* A. Milne Edwards ; Nicol Bay (Miers 1884).
*T. macropus* Montgomery ; East Wallaby Island.
*T. dakini* Montgomery ; Abrolhos Islands.

*Thalamita stimpsoni* A. Milne Edwards.

Haswell 1882, p. 80.
Miers 1884, p. 352.
Ortmann 1894, p. 46.
Grant and McCulloch 1906, p. 18.

*Localities.*—1 female (Cl. 37 mm., Cb. 58 mm.), Turtle Island, 19° 54′ S., 118° 54′ E., coll. Gale (M.H.).
Shark Bay—Browne Station, Denham, Useless Inlet (M.H.).

*Distribution.*—From the Red Sea to New Guinea and the Philippines, Samoa. In Australia known hitherto only from the east and north coasts—Port Molle, Port Denison, Port Curtis, Thursday Island. Not occurring in New Zealand.

*Thalamita intermedia* Miers.

Miers 1886, p. 196, pl. 16, fig. 1.
Ortmann 1894, p. 46.
Rathbun 1924, p. 24.
Hale 1927 (b), p. 151, fig. 152.

*Locality.*—1 female non-ovig. (Cl. 23 mm., Cb. 36 mm.), Onslow ; coll. Gale (M.H.).

The last antero-lateral spine exceeds the others in length.

*Distribution.*—The distribution is limited ; Torres Strait (Miers), Thursday Island (Ortmann), Cape Jaubert (Rathbun), Great Australian Bight (Hale), ? Ceylon (Alcock 1899, p. 89).

*Thalamita integra* Dana.

Alcock 1899, p. 85.

*Locality.*—1 male, Surf Point, Shark Bay ; 0·5–3·5 m. (M.H.).

*Distribution.*—Warmer Indo-Pacific, from the Red Sea and the Seychelles to the Hawaiian and Paumotu Islands. Not known from New Zealand, and hitherto not from Australia.

*Thalamita sima* H. Milne Edwards.

Haswell 1882, p. 80.
Miers 1884, p. 231 ; 1886, p. 195.
Grant and McCulloch 1906, p. 19.
Rathbun 1924, p. 24.
Hale 1927 (b), p. 151.
Chilton and Bennett 1929, p. 755.
Montgomery 1931, p. 430, pl. 29, fig. 2.

*Localities.*—Shark Bay—Brown Station, Heirisson Prong, Useless Inlet, Denham, Freycinet Reach (M.H.).
Fremantle District—Cockburn Sound, Warnbro Sound, near Fremantle (M.H.).

*Distribution.*—In the whole of the warmer Indo-Pacific, from East Africa to Hawaii. On the east coast of Australia it is known from Queensland to Port Jackson ; also south coast (Challenger). On the west coast : Cape Jaubert (Rathbun), Shark Bay, Swan River (Miers), Abrolhos Islands (Montgomery). Recorded from New Zealand, but authenticity doubtful (Chilton and Bennett).

### FAMILY ATELYCYCLIDAE.

*Kraussia nitida* Stimpson.

Balss 1922, p. 98 (refs.).

*Kraussia hendersoni* Montgomery 1931, p. 433.

*Localities.*—Surf Point, Shark Bay ; 1 female, f.o.b. 9 mm., Cb. 14 mm.; 1 male, f.o.b. 7 mm., Cb. 11 mm.
Inner Bar, Shark Bay ; 1 female, f.o.b. 6 mm., Cb. 11 mm. (M.H.).
South Passage, Shark Bay ; 1 female, f.o.b. 7 mm., Cb. 13 m.m.

In the above measurements the first figure refers to the fronto-orbital breadth, the second to the maximum breadth of the carapace. Since the distinction between *K. nitida* and *K. hendersoni* depends on the ratio between the two, it may be pointed out that in the above specimens it varies from 0·53 : 1 to 0·64 : 1, so that the two species merge together.

*Distribution.*—(1) *K. nitida* : Ceylon, Maldives, Gulf of Siam, Thursday Island, Japan, China Sea. (2) *K. hendersoni* : Coast of eastern India, Andamans, Samoa, Japan, Abrolhos Islands.

### Family XANTHIDAE Alcock.

The interrelationships of the various genera and groups of this large family are still very obscure, so that we are still far from a natural arrangement. I shall only remark here that I regard those forms with a four-lobed or four-toothed rostrum as more primitive than those with only two lobes, and that I attach considerable importance to the structure of the copulatory organs, especially of the second pair. The absence of palatal ridges is to be taken as more primitive than their presence, the ridges representing an adaptation to sedentary and perhaps burrowing habits whereby the exhalant passage for the respiratory current is furnished with a more precise boundary. Further primitive characters within the group are the shortness and mobility of the first joint of the antenna, and the seven-jointed condition of the male abdomen.

The two major subdivisions of Alcock, separated by the presence or absence of endostomial ridges, are provisionally admitted here, although in the Section Hyperomerista, which includes the forms provided with such ridges, there are various genera and species which do not possess them. Yet these genera (*Heteropilumnus*) are so close to the others in appearance that I, nevertheless, include them in the Hyperomerista.

### Section I.—HYPEROLISSA Alcock.

Alcock 1898, p. 77.

### Genus XANTHO Leach.

Odhner 1925, p. 79.

*Xantho* (*Leptodius cavipes* (Dana).

Alcock 1898, p. 122.
Rathbun 1911, p. 216, pl. 18, fig. 10.
Calman 1909, p. 704.

*Locality.*—Pearl Bank, Useless Inlet, Shark Bay ; 0·3–5 m. (M.H.).

*Distribution.*—Western Indo-Pacific. Red Sea, Zanzibar, Peros, Ceylon, Andamans, Mergui Archipelago, Penang, Bonin Islands, Christmas Island, Palau Berhala. New for Australia.

*Xantho* (*Leptodius*) *exaratus* Milne Edwards.

Miers 1884, p. 214.
Alcock 1898, p. 118.
Grant and McCulloch 1906, p. 10.

*Locality.*—Cossack (M.H.).

*Distribution.*—The usual form in the warmer Indo-Pacific. Known from Australia already, though from a few spots only ; Port Curtis, Port Molle (Miers), Shark Bay (Miers) ; not on the south coast.

*Xantho danae* Odhner.

*Chlorodius nudipes* Dana 1852, p. 209, pl. 11, fig. 12.

*Leptodius nudipes* A. Milne Edwards 1873 (b), p. 225
Miers 1876 (b), p. 17.
Filhol 1885, p. 374.
de Man 1887, p. 33 ; 1895, p. 521.
Alcock 1898, p. 121.
Borradaile 1902, p. 252.
Rathbun 1906, p. 848, pl. 9, fig. 3 ; 1911, p. 216.
Lenz 1910, p. 548.
Bouvier 1915, p. 105.
Gravier 1920, p. 466.
Sendler 1923, p. 37.
Chilton and Bennett 1929, p. 747.

*Xantho exaratus nudipes* Ortmann 1893, p. 447.

*Xantho danae* Odhner 1925, p. 80.

*Localities.*—Shark Bay, Denham and Smith Island; on the beach (M.H.).

*Remarks.*—This species should not be confused with *Xantho nudipes* A. Milne Edwards from New Caledonia, Kermadec Islands, etc. I therefore provide the above synonymy in the light of Odhner's investigations.

*Distribution.*—Madagascar (Lenz, Gravier), Andamans (Alcock, de Man), Peros (Rathbun), Laccadives (Borradaile), Mauritius (Bouvier), Celebes (de Man), Mangsi Islands, China (Dana), New Caledonia (A. Milne Edwards), Palau Islands (Sendler), Hawaii (Rathbun), Carolines (Ortmann). The record from Cook Strait, New Zealand, is questioned by Chilton and Bennett. New for Australia.

*Etisus anaglyptus* Milne Edwards.

Haswell 1882, p. 55.
Balss 1924, p. 11.

*Locality.*—1 male, Port Denison, Queensland ; Cl. 30 mm., Cb. 55 mm. (M.H).

*Distribution.*—Throughout the Indo-Pacific, from the Red Sea to Samoa, Rotuma. Recorded from Australia only by Haswell, who does not specify the locality.

### Genus PARAPANOPE de Man.

*Parapanope* de Man 1895, p. 514.

*Hoploxanthus* Alcock 1898, p. 125.

The generic name is most unfortunately chosen, as there is no relationship with *Panopeus* ; the affinities are rather, as Alcock justly points out, in the neighbourhood of *Xantho* and *Halimede*. Endostomial ridges are completely lacking.

#### *Parapanope euagora* de Man.

*Parapanope euagora* de Man 1895, Vol. IX., p. 514, pl. 12, fig. 4.
Lanchester 1900, p. 737.
Rathbun 1929, p. 100.

*Hoploxanthus hextii* Alcock 1898, p. 126 ; Illustrations *Investigator*, pl. 37, fig. 1.
(cf. de Man 1902, p. 595, note.)

*Locality.*—1 female ovig. (Cl. 11 mm., Cb. 14·5 mm.) ; Fuchau, China ; coll. Siemsen (M.H.). Compared with the type.

*Distribution.*—Eastern coasts of India, Nicobars (Alcock) ; Malacca (Lanchester) ; Java Sea (de Man) ; China-Tsimei, Amoy, Liuwutien.

### Genus XANTHIAS Rathbun (*sensu stricto*).

Odhner 1925. p. 84.

#### *Xanthias lamarcki* (H. Milne Edwards).

*Xanthodes lamarcki* Alcock 1898, p. 157 (refs.).
Grant and McCulloch 1906, p. 12.
Chilton 1911, pp. 44, 556.

*Xanthias lamarcki* Hale 1929, p. 69.

*Locality.*—1 female, Surf Point, Shark Bay, 0·5–3·5 m.... (M.H.).

*Distribution.*—Throughout the warmer Indo-Pacific, from Mozambique to Polynesia. Rare in Australia ; Masthead Island, Queensland (Grant and McCulloch), Kermadec Islands (Chilton), not on the south coast ; Dirk Hartog Island, west coast (Hale).

### Genus PARAXANTHIAS Odhner.

Odhner 1925, p. 85.

#### *Paraxanthias elegans* (Stimpson.)

*Xanthodes elegans* Stimpson 1858, p. 33 ; 1907, p. 47, pl. 5, fig. 3.
*atromanus* Haswell 1882, p. 49, pl. 1, fig. 1.
Grant and McCulloch 1906, p. 12 ; 1907, p. 151.
Rathbun 1914, p. 659.

*Paraxanthias elegans* Odhner 1925, p. 84.

Montgomery 1931, p. 441.

*Xanthias elegans* Hale 1929, p. 69.

*Localities.*—Shark Bay—Surf Point, Inner Bar, South Passage, Sunday Island ; upper littoral (M.H.).

*Distribution.*—Simoda, Japan (Stimpson), Norfolk Island (Grant and McCulloch), Monte Bello Islands (Rathbun), Dirk Hartog Island (Hale), Abrolhos Islands (Montgomery).

*Paraxanthias ? ponapensis* (Rathbun).

(Pl. XIII., Fig. 2.)

*Xanthias ponapensis* Rathbun 1907, p. 44, pl. 7, figs. 5. 5a.

*Locality.*—1 female (Cl. 21 mm., Cb. 32 mm.), Manus Island, Admiralty Islands ; L. Cohn coll. (M.M.).

*Description.*—I refer the present species with some hesitation to Miss Rathbun's species, which was described from only a small specimen (Cl. 6·5 mm., Cb. 9·7 mm.).

The upper surface of the carapace is smooth and without granules ; the grooves are sharply impressed, and resemble in their arrangement those of *Xanthias* (*Eudora*) *tetraodon* Heller. In colour it is yellowish, sprinkled with red dots. The front has two middle lobes, rounded and moderately projecting, and two lateral lobes, which are small and pointed, and are distinctly separated from the upper orbital margin by a furrow. On the upper orbital margins the grooves and the extraorbital tooth are not pronounced, but the inner tooth on the under margin projects distinctly. The antero-lateral margin is thick, the first two teeth are small tubercles, the hinder project distinctly as blunt spines.

The chelipeds are somewhat unequal, the left being the larger ; in both the upper surface of the carpus and palm is quite smooth. Both palms have a furrow arising from the upper carpal articulation. The fingers are fairly strong, the inner tooth is only small and flat, so that the fingers can completely close ; they are black in colour except for the whitish tips ; the colour ceases at the palm by an oblique line.

The legs are strongly haired along the margins ; the meri have no teeth along the upper edge.

The present specimen differs from Rathbun's description in the lack of granules on the carapace and chelae and of spines on the meri of the walking legs. I regard it as the adult stage of the same species.

*Affinities.*—On account of the structure of the front the species must be referred to the genus *Paraxanthias* Odhner.

*Distribution.*—Hitherto known only from Papete (Tahiti).

Genus CARPILODES Dana.

Odhner 1925, p. 8.

*Carpilodes hartmeyeri* Odhner.

Ohdner (*l.c.*) has described *C. hartmeyeri* as a new species, from material collected at Shark Bay by the Hamburg Expedition to S.W. Australia.

Genus ACTAEA de Haan.

Odhner 1925, p. 35.

From the material secured by the expedition, Odhner has described :—

*A. michaelseni* Odhner (as n. sp.) ; Browne Station, Shark Bay ; also recorded by Hale (1929, p. 69) from Dirk Hartog Island.

*A. savignyi* Milne Edwards ; Shark Bay.

*A. peroni occidentalis* Odhner (as nov. subsp.) ; Koombana Bay, Bunbury, and Oyster Harbour, Albany District.

*A. areolata* Dana ; Turtle Island, N.W. Australia.

*Actaea scabra* Odhner.

Odhner 1925, p. 37, pl. 2, fig. 18.

*Localities.*—1 female, Cl. 34 mm., Cb. 46 mm. ; Marquesas Islands (M.H.).
1 female, Cl. 25 mm., Cb. 37 mm., Port Denison (M.H.).

*Remarks.*—Is not this the adult stage of *A. depressa* White ? Or is there a sexual dimorphism, *depressa* representing the male and *scabra* the female ? The occurrence of both forms in the same locality (Marquesas) adds point to the suspicion that the two should be united.

*Actaea depressa* (White).

Odhner 1925, p. 38, pl. 2, fig. 19.

*Locality.*—1 male (Cl. 26 mm., Cb. 32 mm.) ; Marquesas Islands (M.H.).

*Distribution.*—Hitherto known from Natal, Mergui Islands, Andamans, Philippines, Bonin Islands ; the subsp. *abrolhensis* Montgomery 1931 comes from the Abrolhos Islands, Western Australia.

*Actaea calculosa* Milne Edwards.

*Actaea calculosa* Haswell 1882, p. 45.
Grant and McCulloch 1906, p. 11.
Rathbun 1923, p. 10 ; 1924, p. 17.
Odhner 1925, p. 52.
Hale 1927 (a), p. 311 ; 1927 (b), p. 159.
Montgomery 1931, p. 437.

*Euxanthus tuberculosus* Miers 1884, p. 205, pl. 19, fig. A.

*Localities.*—Barrow Island (M.H.).
Shark Bay (M.H.).
Cockburn Sound, Fremantle District (M.H.).

*Distribution.*—Red Sea to Tahiti. In Australia known from the east coast (Sydney, Port Curtis, Port Denison), from the south (Adelaide, Kangaroo Island, Cape Jervis, Spencer Gulf), west (Holothuria Bank), north (Torres Strait), and from the Abrolhos Islands.

Genus ATERGATOPSIS A. Milne Edwards.

Klunzinger 1913, p. 153 (refs.).

On account of the arrangement of the antennal joints the genus comes nearest to *Neoliomera*.

*Atergatopsis signata* (Adams and White).

*Carpilius signatus* Adams and White 1848, p. 37, pl. X., fig. 1.

*Atergatopsis signata* A. Milne Edwards 1865 (a), p. 253.
Hilgendorf 1878, p. 787.
Rathbun 1911, p. 214, pl. 17, fig. 7.
Klunzinger 1913, p. 154, pl. 5, figs. 8, 8 a–b.
Bouvier 1915, p. 114.
Balss 1924, p. 6.

*Atergatopsis flavomaculatus* A. Milne Edwards 1865 (a), p. 254, pl. 12, fig. 1.
Lenz 1905, p. 349 ; 1910, p. 546.

*Atergatis frauenfeldi* Heller 1861, p. 311, pl. 1, fig. 10.

*Atergatopsis frauenfeldi* A Milne Edwards 1865 (a), p. 258.
Nobili 1906 (b), p. 234.

*Locality.*—1 male (Cl. 62 mm., Cb. 90 mm.), reputably from Sydney (M.H.).

*Distribution.*—Hitherto known only from the western part of the Indo-Pacific ; Red Sea, Mozambique, Island of Europe, Coetivy, Pondicherry, Mauritius.

*Atergatopsis lucasii* Montrouzier.

*Atergatopsis Lucasii* Montrouzier 1865, p. 160.
A. Milne Edwards 1865 (a), p. 256, pl. 13, fig. 1 ; 1873 (b), p. 190.

*Locality.*—1 male, Paulau, Cl. 25 mm., Cb. 38 mm. (M.H.). The first rediscovery of this species.

*Distribution.*—Hitherto known only from New Caledonia.

*Atergatopsis granulatus* A. Milne Edwards.

A. Milne Edwards 1865 (a), p. 255, pl. 13, fig. 2.
Miers 1884, p. 529 ; 1886, p. 123.
Kossman 1877, p. 22.
Nobili 1906 (b), p. 235 (name only).
Klunzinger 1913 (name only), p. 156.

*Locality.*—1 female (Cl. 28 mm., Cb. 40 mm.), Macclesfield Bank (B.M.).

*Distribution.*—Red Sea, Zanzibar, Marie Louise Island (Amirante), Philippines, New Guinea.

**Atergatopsis (?) globosa** sp. nov.

(Pl. XIII., fig. 4.)

*Locality.*—1 female, Freycinet Reach, 10–13 m. depth (M.H.).

*Description.*—The carapace is strongly inflated in both directions, that is, from front to back and from side to side ; it therefore resembles many species of *Actaea* (such as *A. subglobosa* Stimpson). The upper surface is evenly and moderately granulated, the lateral margin sharp. The antero-lateral margin is very long, and passes by a well arched curve into the strongly curved postero-lateral margin. On the upper surface a few fine but distinct grooves bound several regions ; 3M is especially clear, at least in front, and is distinct from 2M, while the boundaries between 4M and 1P

are less sharply defined. Also 1L, 2L, and 3L are distinctly visible ; the groove separating 4L and 1R is faintly impressed. A wider faint furrow separates the orbital region from 2M and the frontal region. In the branchial region there are two moderately deep notches on each side ; teeth are quite absent from the antero-lateral edges.

The front consists of two median and two lateral lobes ; the former project out sharply and the frontal margin passes from them in a concave arc to the two smaller lateral lobes, which are likewise sharp and are marked off from the upper orbital margin by a notch. The frontal margin and the upper margin of the orbit are finely granulated. The two upper grooves continue well on to the latter ; there is no extra-orbital tooth, but in its place on the under margin there is a fine notch ; the lower margin itself is again finely granulated.

The antennal region corresponds to that of *Atergatopsis*, in that the second joint unites with the lower frontal process by an inner process, and the very short flagellum lies within the orbit. The lower side of the carapace is smooth, not granulated, but in front it is strongly haired, as are also the third maxillipeds.

The chelipeds are of equal size. The merus and carpus have a sharp upper edge and their inner surface is smooth and flat, so that they can lie close against the under side of the carapace ; the swollen outer surface on the other hand is somewhat granulated and hairy. The chelae are massive, the palm has a sharp upper margin, and its fairly flat though inflated outer surface is finely granulated over the upper half, whereas the lower half is smooth ; the lower margin is rounded. The fingers are short ; the upper or movable finger is strongly deflexed, and the tips of the two fingers cross. The upper margin of the movable one is at first granulated, but the outer surfaces of both are smooth and shiny. There are only two small teeth on the movable finger, but the cutting edge is sharp ; the immovable finger bears two small teeth also, at the middle of its length, and the cutting edge is also sharp ; the fingers are therefore of the *Baraneia* type.

The legs are comparatively short ; the joints are high and the concave naked anterior side fits against the convex granulated posterior side of the preceding limb. The upper and lower margins are sharp, and those of the meri are furnished with long hairs.

*Affinities.*—This form is very similar to *Actaea* (*Baraneia*) *inconspicua* Miers 1884 from Port Darwin, which differs however in the hairs on the carapace and chelae ; its carapace also appears to be broader and the front and chelae are different in form. Since the present species has the antennary region as in *Atergatopsis*, I place it in the latter genus ; *Actaea* and *Atergatopsis* are in fact connected through this species, as also through *Actaea inconspicua*.

*Measurements :—*

Length of Carapace, 19 mm.

Breadth of Carapace, 25 mm.

Chelipeds—Merus : Length of upper margin, 7·5 mm.

Carpus : ,, ,, ,, 8 mm.

Palm : ,, ,, ,, 5 mm.

Palm : Length of lower margin (including finger), 11 mm.

Palm : Height 7·5 mm.

*Atergatis ocyroe* (Herbst).

Alcock 1898, p. 207.

Grant and McCulloch 1906, p. 9.

Rathbun 1914, p. 657.

*Localities.*—2 males, 2 females, Turtle Island, coll. Gale (M.H.).
1 male, Abrolhos Islands (M.H.).

*Distribution.*—Throughout the warmer Indo-Pacific, from East Africa to Tahiti. In Australia known from the east coast—Port Denison, Queensland, Torres Strait (Calman), Port Essington (Miers, Haswell, Grant, and McCulloch) ; and from the west coast—Monte Bello Islands (Rathbun), Swan River (Miers). Not known from the southern coast nor from New Zealand.

*Chlorodopsis areolata* (H. Milne Edwards).

Alcock 1898, p. 116.

Balss 1922, p. 131.

Sendler 1923, p. 38.

Hale 1929, p. 70 (refs.).

Montgomery 1931, p. 443.

*Locality.*—Surf Point, Shark Bay ; 0·5–3·5 mm. (M.H.).

*Distribution.*—Throughout the warmer Indo-Pacific, from the east coast of Africa to Polynesia and Japan. In Australia known already from Port Essington (Miers), Port Jackson (Haswell). Dirk Hartog Island (Hale), Abrolhos Islands, Swan River (Montgomery). Not known from the south coast.

*Cymo andreossyi* (Audouin).

Alcock 1898, p. 173.

Grant and McCulloch 1906, p. 13.

Nobili 1900, p. 259.

*Locality.*—Surf Point, Shark Bay, 0·5–3·5 mm. (M.H.).

*Distribution.*—A common form of the coral reefs of the Indo-Pacific, from the Red Sea to Tahiti. In Australia known from Port Curtis district, Queensland ; Norfolk Island (de Man), Beagle Bay (Nobili).

## Section II.—HYPEROMERISTA Alcock.

Most of the representatives of this section belong to the genera *Pilumnus* and *Actumnus*. I have dealt with the species from Western Australia in the course of a larger work in the *Capita zoologica*.

*Trapezia cymodoce* (Herbst).

Haswell 1882, p. 76.
Alcock 1898, p. 219 (refs.).
Nobili 1900, p. 260.
Rathbun 1923, p. 129.

*Localities.*—Shark Bay, Surf Point, Sunday Island, South Passage (M.H.).
Green Island, off Rottnest Island (beach), Fremantle district (M.H.).

*Distribution.*—The usual form of the coral reefs of the Indo-Pacific, from the Red Sea to Tahiti. In Australia hitherto known chiefly from the east coast (Queensland). Not present on the south coast.

*Eriphia laevimana* Latreille.

Miers 1884, p. 534.
Haswell 1882, p. 75.
Grant and McCulloch 1906, p. 14.

*Locality.*—1 female, non-ovig., N.W. Australia ; without further data (M.H.).

*Distribution.*—Widely distributed in the warmer Indo-Pacific. In Australia hitherto known chiefly from the east coast ; Moreton Bay, Queensland (Miers), Mast Head Island (Grant and McCulloch), Port Denison (Haswell). Absent on the south coast.

FAMILY OCYPODIDAE.

GENUS OCYPODA Fabr.

Ortmann 1897, p. 359.

The genus includes the well known Sand Crabs of the tropics. No species are known from South Australia, but some spread down the east coast. The only other species, in addition to the two below, recorded from Western Australia is *O. kuhli* de Haan (Miers 1884) from Shark Bay.

*Ocypoda aegyptiaca* Gerstaecker.

Balss 1924, p. 14.

*Locality.*—1 male (Cl. 35 mm., Cb. 53 mm.) (M.H.). Compared with specimens from the Red Sea.

*Distribution.*—Previously known only from the Red Sea and Madagascar.

*Ocypoda pygoides* Ortmann.

*O. pygoides* Ortmann 1894, p. 766, pl. 23, fig. 19.
*O. pygioides* (*sic*) Montgomery 1931, p. 451, pl. 25, fig. 1 ; pl. 27, figs. 5, 5a.

*Localities.*—2 males (Cl. about 45 mm., Cb. 52 mm.) ; Dongarra, Geraldton.
1 female (Cl. 46 mm., Cb. 52 mm.), Barrow Island (M.H.).

*Distribution.*—Hitherto known only from Naturaliste Channel, Cottesloe (N. of Fremantle), and the Abrolhos.

*Ocypoda ceratophthalma* (Pallas).

Alcock 1900, p. 345.
Grant and McCulloch 1906, p. 20.
McCulloch 1918, p. 2.

*Locality.*—2 males, Barrow Island (M.H.).

*Distribution.*—A common form of the Indo-Pacific, but uncommon in Australia. Eastern : Cape Grenville (Cape York Peninsula) (Haswell), Rain Island (Challenger), Port Curtis district, Queensland (Grant and McCulloch), Friday Island, Moreton Island, N.S.W. (Miers). Northern : Beagle Bay (Nobili), King Sound (McCulloch). Not on the southern coast.

*Uca dussumieri* (H. Milne Edwards).

Haswell 1882, p. 93.
Alcock 1900, p. 61.
Grant and McCulloch 1906, p. 20.
Rathbun 1924, p. 8.

*Locality.*—Abrolhos Islands.

*Distribution.*—In the whole of the Indo-Pacific, from east Africa to Tahiti. In Australia known from Moreton Bay, Queensland (Grant and McCulloch), Port Darwin (Haswell), Broome (Rathbun).

*Mictyris longicarpus* Latr.

McNeill 1926, p. 102, pl. 9, fig. 1 (refs.).

*Localities.*—Abrolhos Islands (M.H.).
Cossack (M.H.).

*Distribution.*—Tropical Indo-Pacific ; east, north, and west coasts of Australia, New Caledonia, New Guinea, Singapore, Andamans, Bay of Bengal, etc. (cf. McNeill). Not known from the South Australian coast.

*Macrophthalmus* (*Euplax*) *boscii* Audouin.

*Euplax boscii* Tesch 1918, p. 60 (refs.).
*Macrophthalmus boscii* Kemp 1919, p. 383, pl. 24, fig. 6.

*Localities.*—1 female, Cossack, coll. Gale (M.H.).
1 female, Port Hedland, coll. Gale (M.H.).

*Distribution.*—Common in the whole of the tropical Indo-Pacific from Natal to the Riu-Kiu Islands and Fiji Islands. Not in British India. New for Australia.

FAMILY GRAPSIDAE.

*Grapsus strigosus* Herbst.

Tesch 1918, p. 71, pl. 4, figs. 1, 4.

*Locality.*—3 specimens, Cossack (M.H.).

*Distribution.*—Common in the whole of the warmer Indo-Pacific but rare in Australia—recorded only by Haswell 1882, p. 97, without mention of precise locality.

*Metopograpsus messor* (Forskall).

Miers 1884, p. 245.
Nobili 1900, p. 265.
Grant and McCulloch 1906, p. 23.
Tesch 1918, p. 79.
McCulloch 1918, p. 2.
Rathbun 1902, p. 13.

*Localities.*—Cossack, Onslow, Shark Bay (M.H.).

*Distribution.*—In the whole of the warmer Indo-Pacific ; known in Australia both from the east coast (Moreton Bay, Queensland) from the north—King's Sound (McCulloch), Broome (Rathbun), and from the west Shark Bay (Miers). It is not however recorded in Hale's catalogue of the South Australian forms.

*Leptograpsus variegatus* (Fabr.).

*Grapsus variegatus* Haswell 1882, p. 97.
Filhol 1885, p. 388.

*Leptograpsus variegatus* Stimpson 1907, p. 117.
Grant and McCulloch 1917, p. 154.
Chilton 1911, p. 560.
Borradaile 1916, p. 101.
Rathbun 1918, p. 234, pl. 56.
Hale 1924, p. 69 ; 1927 (b), p. 180, fig. 181.
Chilton and Bennett 1929, p. 763.
Montgomery 1931, p. 451.
Miers 1876 (b), p. 36.
Whitelegge 1900, p. 160.

*Localities.*—3 specimens, Shark Bay (M.H.).
2 juv., Cottesloe ; 7 males, 3 females, Rottnest Island, beach (M.H.).
Several, Rockhampton, Queensland, coll. Salmin (M.M.).

*Distribution.*—West coast of South America (Peru, Chile), Easter Island, Juan Fernandez, New Zealand, Norfolk Island, Australia (east, south, and west coasts). The old record from Shanghai by Heller, and that from Pernambuco by Kingsley, are erroneous. The species thus prefers colder waters ; on the coast of Western Australia it does not spread to the north (Monte Bello Islands, Cape Jaubert). On the east coast the most northern locality from which it has been recorded appears to be Rockhampton.

*Brachynotus octodentatus* (H. Milne Edwards).

Tesch 1918, p. 106.
Hale 1924, p. 69 ; 1927 (a), p. 312 ; 1927 (b), p. 182, fig. 183.

*Localities.*—Princess Royal Harbour, Albany district ; beach (M.H.).
Cave Point, Albany district ; beach (Cl. 43 mm., Cb. 55 mm.) (M.H.).

*Remarks.*—*Leptograpsodes webbaysi* Montgomery 1931, p. 452, is evidently identical with this species, as the differences quoted are very slight.

*Distribution.*—Southern half of Australia ; Sydney, King Island, Port Phillip, Kangaroo Island, Nuyts Archipelago, Tasmania.

Genus CYCLOGRAPSUS H. Milne Edwards.

Tesch 1918, p. 125 (Revision).

Tesch has omitted *C. becarii* Nobili (1900, p. 270) from New Guinea. *C. tasmanicus* Jacquinot and Lucas (1853, p. 76, pl. 6, fig. 6) from Hobart, Tasmania, has been quite lost from our ken.

*Cyclograpsus punctatus audouinii* H. Milne Edwards.

*Cyclograpsus audouinii* Tesch 1918, p. 126 (refs.).
Hale 1924, p. 70 ; 1927 (a), p. 312 ; 1927 (b), p. 176, fig. 176.
Edmondson 1925, p. 56.
Montgomery 1931, p. 456.
*lavauxi* M.E. in Chilton 1911, p. 560.

*Localities*,—Shark Bay ; Browne Station, Dirk Hartog beach (M.H.). North Fremantle, beach (M.H.). Princess Royal Harbour, Albany District, beach (M.H.).

*Remarks*.—I regard this form as a subspecies of *C. punctatus* from the Cape of Good Hope and South America. The differences from this *forma typica* have been best analysed by Rathbun (1918, p. 329).

*Distribution*.—The subsp. *audouinii* occurs at Port Jackson (Stimpson), Flinders Island, Kangaroo Island (Hale), New Zealand (Miers, etc.), Stewart Island (Filhol), Kermadec Islands (Chilton), Wake, Fanning, and Palmyra Islands, New Guinea (Edmondson). The forma typica occurs in Chile, Juan Fernandez, and the Cape of Good Hope.

*Cyclograpsus whitei* H. Milne Edwards.

*Cyclograpsus whitei* Chilton and Bennett 1929, p. 789.

*Epigrapsus politus* Lenz 1901, p. 471 (not of Heller).

Chilton and Bennett (1929, p. 762) state that they have not seen specimens of *Epigrapsus politus* Heller from New Zealand, though Lenz recorded it from French Pass. I have before me one of Lenz's male specimens (M.M.), and it now appears that both genus and species were incorrectly determined, and that the specimen belongs to the above species, previously known from New Zealand. The tropical Indo-Pacific *Epigrapsus politus* is therefore to be erased from the New Zealand list.

*Plagusia depressa tuberculata* Lamarck.

Tesch 1918, p. 128.

*Locality*.—West of Lagoon Point, Shark Bay ; on sandy bottom ; coll. Gale (M.H.).

*Distribution*.—Warmer Indo-Pacific and Atlantic. In Australia it has hitherto been known only from Port Jackson (Haswell 1882, p. 110) ; not present on the south coast.

*Plagusia capensis* de Haan.

*Plagusia capensis* Tesch 1918, p. 129 (refs.).
Rathbun 1923, p. 96.

*Plagusia chabrus* Haswell 1882, p. 111.
Chilton 1911, p. 558.
Hale 1927 (a), p. 333 ; 1927 (b), p. 185, fig. 186.
Chilton and Bennett 1929, p. 774.

*Plagusia capensis* Montgomery 1931, p. 457.

*Localities*.—1 juv., east coast of Rottnest Island, Fremantle district (M.H.).
1 specimen, Casuarina Point, Bunbury district ; beach (M.H.).

*Distribution*.—A circum-subantarctic cold-water form ; South Africa, South Australia, Tasmania, New Zealand, Kermadec Islands, Tongatabu, Juan Fernandez, Chile. In Australia only on southerly coasts—Bass Strait (?) (Rathbun), Kangaroo Island (Hale), New South Wales (Haswell). The nearest relative is *P. dentipes* de Haan from Japan, Bismarck Archipelago, etc., a form which spreads to the Kermadecs, Norfolk and Lord Howe Island, but not to New Zealand or northern Australia.

*Percnon planissimum* (Herbst).

Tesch 1918, p. 130.

Grant and McCulloch 1907, p. 153.

Hale 1929, p. 70, pl. 5.

Montgomery 1931, p. 457.

*Locality.*—Surf Point, Shark Bay ; sandy and rocky bottom ; 0·5–3·5 m. (M.H.).

*Distribution.*—Common in the warmer part of the Indo-Pacific and Atlantic. There are remarkably few Australian records : Torres Strait (Haswell), Norfolk Island (Grant and McCulloch), Dirk Hartog Island, W.A. (Hale), Abrolhos Islands (Montgomery). Absent from the south coast.

## OBSERVATIONS ON THE ZOOGEOGRAPHY OF WESTERN AUSTRALIA.

Before entering upon a discussion of the zoogeographical results I provide a list of the most important of the various collecting stations repeatedly referred to in the above report.

Turtle Island, 19° 54′ S., 118° 54′ E.
Monte Bello Islands, about 20° 30′ S.
Cossack, 20° 39′ S., 117° 13′ E.
Barrow Island, about 21° S.
Onslow, about 21° 30′ S.
Shark Bay and Dirk Hartog Island, about 26° S.
Geraldton, 28° 45′ S.
Fremantle and Swan River, 32° S.
Bunbury, about 33° 15′ S.
Albany, about 35° S., 118° E.

The editors of *Die Fauna Südwest-Australiens* ; *Ergebnisse der Hamburger Südwestaustralischen Forschungsreise* 1905, ed. by W. Michaelsen and R. Hartmeyer (G. Fischer, Jena) have given in Vol. 1 of that work (Vol. 1, 1907) a physico-physiognomical description of the chief collecting stations, to which, and especially to the map, attention may here be drawn. It need be remarked here only that the material secured was taken from the upper littoral to a depth of 18 m. at the most.

### I. ONSLOW AND COSSACK DISTRICT.

The following species were collected :—

Turtle Island :—

*Atergatis ocyroe.*
*Pilumnus forskalii coerulescens.*

Barrow Island :—

*Paranaxia serpulifera.*
*Ocypode pygoides.*
*O. ceratophthalma.*
*Pilumnus vespertilio.*

Cossack :—

*Cryptodromia tuberculata.*
*Matuta banksii.*
*M. planipes.*
*Menaethius monoceros.*
*Xantho exaratus.*
*Mictyris longicarpus.*
*Macrophthalmus boscii.*
*Grapsus strigosus.*
*Metograpsus messor.*
*Pilumnus vespertilio.*

Onslow :—

*Hyastenus convexus.*
*Schizophrys dama.*
*Thalamita intermedia.*
*Pilumnus longicornis.*
*P. semilanatus.*

These are all tropical forms, and most of them are widely distributed in the Indo-Pacific ; *Atergatis ocyroe*, both spp. of *Matuta*, *Xantho exaratus*, *Hyastenus convexus*, *Pilumnus longicornis* and *P. vespertilio* are for example widely distributed species.

There is however a small number of forms endemic to Australia and particularly to the west coast : *Pilumnus semilanatus*, *Thalamita intermedia*, *Ocypode pygoides*.

## II. SHARK BAY.

The following were found here :—

*Cymo andreossyi.*
*Trapezia cymodoce.*
*Cryptocoeloma haswelli.*
*Actumnus setifer.*
*Pilumnus longicornis.*
*P. semilanatus.*
*P. fissifrons.*
*Ocypoda aegyptiaca.*
*Metopograpsus messor.*
*Leptograpsus variegatus.*
*Cyclograpsus punctatus audouinii.*
*Plaquisa depressa tuberculata.*
*Percnon planissimum.*
*Actaea michaelseni.*
*A. savignyi.*
*A. peroni occidentalis.*
*Carpilodes hartmeyeri.*

Tropical forms still preponderate here by far ; the water at Shark Bay is still warm enough to permit of coral reefs and pearl oyster beds. Typically warm-water forms for example are *Cymo andreossyi*, *Trapezia cymodoce*, *Plagusia depressa*, *Actaea savignyi*. But we come across some species here which are more common on the southern coast and are therefore to be regarded as cold-water forms reaching here their most northerly point ; they are *Leptograpsus variegatus*, *Pilumnus fissifrons*, *Cyclograpsus punctatus audouinii*.

### III. GERALDTON.

Only a small collection was secured from the Geraldton district ; they included *Calappa lophos* and *Schizophrys dama*, both tropical species, and *Ocypoda pygoides*, the endemic species of the west coast.

### IV.—FREMANTLE.

In this district the collections were more numerous, viz. :—

Rottnest Island :—

*Trapezia cymodoce.*
*Plagusia chabrus.*
*Leptograpsus variegatus.*

Cockburn Sound :—

*Dromidiopsis michaelseni.*
*Naxia aurita.*
*Paratymolus latipes quadridentata.*
*Hyastenus oryx.*
*Nectocarcinus integrifrons.*
*Thalamita sima.*
*Actaea calculosa.*
*Pilumnus fissifrons.*

Swan River :—

*Micippa thalia.*
*Neptunus pelagicus.*
*Atergatis ocyroe.*
*Chlorodopsis areolata.*
*Pilumnus etheridgei.*

We have here a typical mixed fauna ; *Hyastenus oryx*, *Micippa thalia*, *Atergatis ocyroe*, *Trapezia cymodoce*, *Chlorodopsis areolata*, *Actea calculosa*, and *Thalamita sima* are tropical forms reaching in this district the southern limit of their distribution on the west coast ; but in general it is the cold-water element of the south coast which mainly decides the *facies* of the fauna, *e.g.*, *Plagusia capensis*, *Naxia aurita*, *Nectocarcinus integrifrons*, *Pilumnus etheridgei*, and *Leptograpsus variegatus*.

In the Bunbury district again there come to light some cold-water forms such as *Plagusia capensis* and *Naxia spinosa*, and intermixed with them still a tropical element in *Actaea peroni occidentalis*.

### V. ALBANY DISTRICT.

Oyster Harbour :—

*Ebalia intermedia.*
*Leptomithrax* aff. *spinulosus.*
*Actea peroni occidentalis.*
*Litocheira bispinosa.*

Princess Royal Harbour :—

*Naxia aurita.*
*Litocheira bispinosa.*
*Brachynotus octodentatus.*
*Cyclograpsus punctatus audouinii.*
*Pilumnus etheridgei.*

Middleton Beach :—

*Naxia aurita.*

These are all typical South Australian forms, as recorded in Hale's Catalogue ; the tropical element has quite disappeared.

The physical characteristics of the waters of the western and southern coasts of Australia are distinctly reflected in their animal population. A characteristic of the western coast is that the cold current from the south which courses up the western coasts of the other southern hemisphere continents (Benguela Current in South Africa, Peru Current in South America) is in this case lacking, so that on this coast the warm-water forms spread well down towards the south. The average temperature of the water at 28° S. is about 20° C., and on the south coast about 17–18° C., about corresponding to that of the Mediterranean and the coast of Portugal (cf. Schott, *Valdivia Oceanographie*, Atlas, pl. 9). It can readily be understood therefore how it is that the tropical and temperate faunas of the west and south coasts gradually intermingle, without showing such a sharp boundary, as for example, occurs in south-western Africa.

## ADDENDUM.

By D. L. SERVENTY.

Since Dr. Balss has prepared the foregoing paper, further contributions by him bearing on the Hamburg Expedition's collections have appeared.

The paper on *Pilumnus* and allied genera referred to on page 113 has been published as "Beiträge zur Kenntnis der Gattung *Pilumnus* und verwandter Gattungen," in *Capita Zoologica*, Deel 4, Afl. 3, pp. 1–47, S' Gravenhage, 1933. The Western Australian representatives dealt with, distributed among the genera *Pilumnus*, *Actumnus*, *Cryptocoeloma and Litocheira*, are enumerated on pages 144–146 of the present paper.

In "Ueber eine neue Art der Gattung Glabropilumnus," *Ann. Mag. Nat. Hist.* (Ser. 10), vol. XV, pp. 664–666, 1935, Dr. Balss describes as a new species, *Glabropilumnus gordonae*, a crab from the Abrolhos Islands which Montgomery in 1931 had referred to *Pilumnus edamensis de Man*. The genus *Glabropilumnus* was erected by Balss in his former paper in *Capita Zoologica*.

A brief zoogeographical review of the collection is given in "Die brachyuren Dekapoden der Reise Michaelsen-Hartmeyer nach Südwestaustralien 1905," in the *Zoologischer Anzeiger*, bd. 111, Heft 1/2, pp. 35–42, 1935, together with descriptions of two further new species recognised in the collections after the main paper had been prepared. *Planotergum mirabile* (p. 36, text-figures 1–3), is a new genus and species from Shark Bay. The species represents an extremely aberrant member of the Oxyrhyncha whose more precise classification is difficult. There are resemblances to the Acanthorychinae and in some features to *Hemus* and *Eucinetops*. The author considers that possibly the genus stands near to *Crossotonotus* A. Milne-Edwards. The other species described is not from Australian seas.

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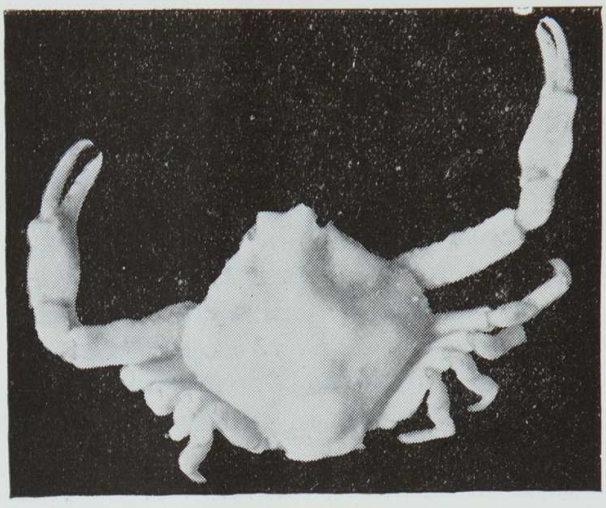

Fig. 1.

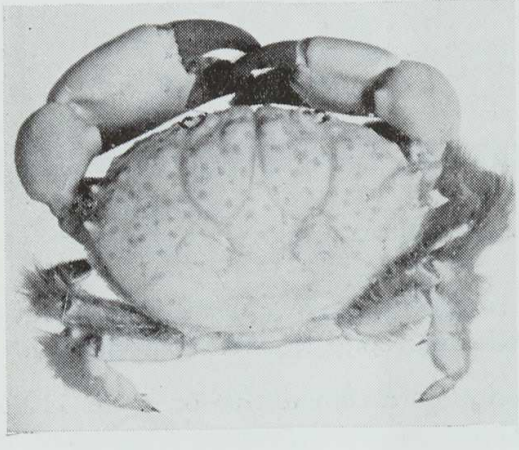

Fig. 2.

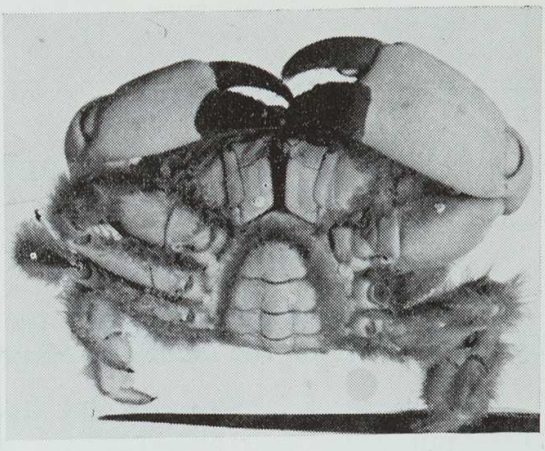

Fig. 3.

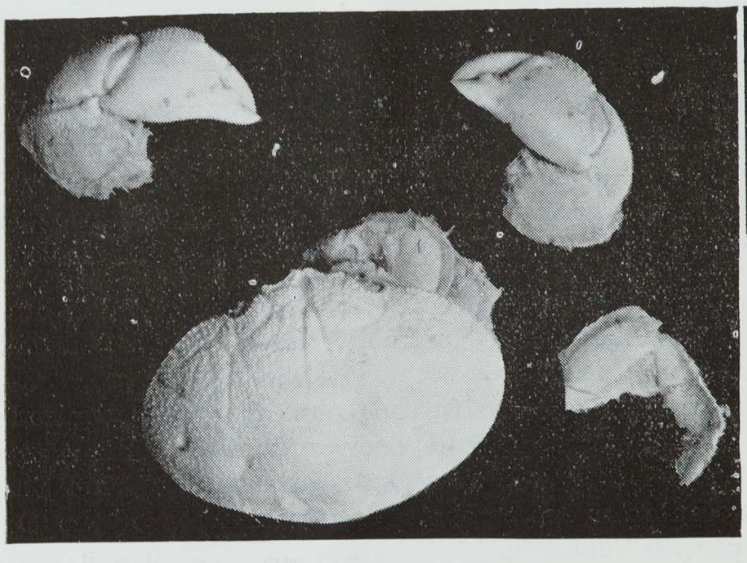

Fig. 4.

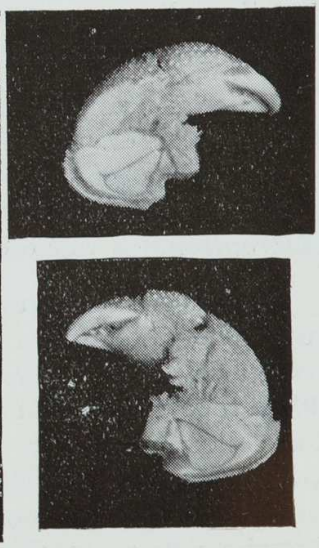

Fig. 5.

Fig. 1.—**Ebalia quadrata** A. Milne Edwards, Type, x 2·3, Bass Strait.
Fig. 2.—**Paraxanthias ponapensis** Rathbun, ♀, from above, x 1, Manus Island.
Fig. 3.—The same, from below, x 1.
Fig. 4.—**Atergatopsis globosa** nov. sp., ♀, from above, Type (M.H.), x 1·5, Freycinet Reach.
Fig. 5.—The same, inner view of chelipeds.

PLATE XIII.

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